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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,475	06/25/2001	Yaakov Navon	NAVON=4	7566

1444	7590	06/17/2004

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EXAMINER
HUNG, YUBIN

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/887,475	NAVON, YAAKOV
	Examiner	Art Unit
	Yubin Hung	2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-42</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-42</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>25 June 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1.   Examiner's Comment: The cover letter for the Information Disclosure Statement

(Form 1449A/PTO) has not been signed. Please submit a signed cover letter for the

IDS filed October 2, 2001 (paper #2).

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 are rejected under 35

U.S.C. 103(a) as being unpatentable over Chakraborty et al. (US 5,995,695) and Ibison

et al. (US 5,506,913).

5.   Regarding claim 1, and similarly claims 15 and 29, Chakraborty et al. discloses

- smearing the image
  [Fig. 2, numeral 200; Col. 4, lines 46-49]
- identifying a region of the image that contains the group of the line
  segments as a possible location of the symbols
  [Fig. 1, numeral 12; Fig. 2, numerals 300, 350; Col. 3, lines 44-48;
  Col. 5, lines 54-57]

Chakraborty et al. does not expressly disclose/suggest the following, which Ibison et al.

teaches

- fitting line segments through edge points of features in the smeared
  image
  [Col. 2, lines 30-31. Note that line fitting is done by Hough
  transform. While Hough transform is not considered by Ibison et al. as
  the best for their purpose, Chakraborty et al. in Col. 4, lines 26-27
  uses it to detect lines.]
- finding a group of the line segments in mutual proximity that are
  mutually substantially parallel
  [Fig. 3; Col. 5, lines 33-44; Col. 13, lines 44-64]

Chakraborty et al. and Ibison et al. are combinable because they are from the same

field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to modify Chakraborty et al. with the teaching of Ibison et al. by fitting lines on edge

points and grouping lines that are nearly parallel and close to each other. The

motivation would have been to take advantage of the fact that in a document text lines

usually are in clusters therefore the presence of a group of nearly parallel lines that are

equally spaced (or nearly so) is a very good indication of a text block.

Therefore, it would have been obvious to combine Ibison et al. with Chakraborty et al. to

obtain the invention of claim 1.

6.   Regarding claim 2, and similarly claims 16 and 30, Chakraborty et al. further

discloses/suggests

- binarizing the image before smearing it
  [Fig. 2, numeral 100]

7.   Regarding claim 7, and similarly claims 21 and 35, Ibison et al.

discloses/suggests

- fitting the line segments comprises applying a Hough transform to the
  edge points
  [Col. 2, lines 30-31. Note that line fitting is done by Hough
  transform. While Hough transform is not considered by Ibison et al. as
  the best for their purpose, Chakraborty et al. in Col. 4, lines 26-27
  uses it to detect lines.]

8.   Regarding claim 10, and similarly claims 24 and 38, Ibison et al. further

discloses/suggests

- finding the group of the line segments comprises finding end points of
  the line segments, and selecting the line segments for inclusion in the
  group whose end points are within a predetermined range of one another
  [Fig. 7(c); Col. 13, lines 58-60. Note that the identification of the
  endpoints is inherent]

9.   Regarding claim 12, and similarly claim 26, Chakraborty et al. and Ibison et al.

further disclose/suggest

- capturing an image of the object
  [Ibison et al.: Fig. 12 ; Col. 17, line 58 - Col. 18, line 7. Note
  also that Col. 3, lines 61-62 of Chakraborty et al. also imply that the
  input image has been captured beforehand]
- applying optical character recognition to read the characters in the
  region
  [Chakraborty et al.: Fig. 1, numeral 14; Fig. 6, numeral 402; Col. 3,
  lines 50-54]

10.   Regarding claim 40, Chakraborty et al. and Ibison et al. disclose/suggest

everything [per the analysis for claim 1 (and similarly claim 29) above], which

Chakraborty et al. further discloses/suggests

- the symbols comprise characters, and wherein the instructions cause the
  computer to apply optical character recognition to read the characters
  in the identified region
  [Fig. 1, numeral 14; Fig. 6, numeral 402; Col. 3, lines 50-54]

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11.   Claims 3, 17, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as applied to

claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in view of

Tamaoki (JP 10-224626, also with English translation).

12.   Regarding claim 3, and similarly claims 17 and 31, Chakraborty et al. and Ibison

et al. disclose/suggest everything except the following, which Tamaoki teaches

- binarizing the image comprises applying selective binarization so as to
  preserve in the binarized image the features of the image that have
  stroke widths in a predetermined range that is associated with the
  symbols
  [Lines 1-8 of the English translation of the abstract]

Chakraborty et al., Ibison et al. and Tamaoki are combinable because they are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Chakraborty et al. and Ibison et al. with the teaching of Tamaoki by applying a binarization approach that will obtain appropriate line width (i.e., the resultant stroke widths are in a predetermined range). The motivation would have been to preserve the integrity of the symbols (e.g., by not causing broken strokes) so as to improve the accuracy of any subsequent OCR operations.

Therefore, it would have been obvious to combine Tamaoki with Chakraborty et al. and Ibison et al. to obtain the invention of claim 3.

***

13.   Claims 4-5, 18-19, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as applied to claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in view of Chiba et al. (JP 08-272965, also with English translation).

14.   Regarding claim 4, and similarly claims 18 and 32, Chakraborty et al. and Ibison et al. disclose/suggest everything except the following, which Chiba teaches

- smearing the image comprises applying a morphological
  expansion operator to the features in the image
  [Lines 9-14 of the English translation of the abstract]

Chakraborty et al., Ibison et al. and Chiba et al. are combinable because they are from

the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to modify Chakraborty et al. and Ibison et al. with the teaching of Chiba et al. by

applying morphological expansion for smearing. The motivation would have been for its

simplicity and the ease of its implementation on a parallel processor.

Therefore, it would have been obvious to combine Chiba et al. with Chakraborty et al.

and Ibison et al. to obtain the invention of claim 4.

15.   Regarding claim 5, and similarly claims 19 and 33, Chiba et al. further teaches

- applying the expansion operator comprises expanding the features in a
  plurality of different directions, and selecting one of the directions
  so as to minimize a number of runs of consecutive pixels in the smeared
  image
  [Lines 6-14 of the English translation of the abstract. Note that for
  each edge pixels (i.e., 'feature') the selected direction is the
  direction perpendicular to the edge direction (i.e., the gradient
  direction). This will minimize the number of runs because the
  expansion direction is along character strokes (see Fig. 5).]

***

16.   Claims 6, 20, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Chakraborty et al. (US 5,995,695), Ibison et al. (US 5,506,913), and Chiba et al. (JP 08-

272965 with English translation) as applied to claims 4-5, 18-19, 32-33 above, further in

view of Yamazaki (US 6,633,409).

17.   Regarding claim 6, and similarly claims 20 and 34, Chakraborty et al., Ibison et

al. and Chiba et al. disclose/suggest everything except the following, which Yamazaki

teaches

- fitting the line segments through the edge points comprises fitting the
  segments through end points of the runs
  [Col. 13, lines 22-26]

Chakraborty et al., Ibison et al., Chiba et al. and Yamazaki are combinable because

they are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to modify Chakraborty et al., Ibison et al. and Chiba et al. with the teaching of Yamazaki

by linearly fitting endpoints of line segments (i.e., runs). The motivation would have

been to reduce the number of points used for line fitting (and thus reduces computation

time) while maintaining the accuracy of the fit (since a run is completely determined by

its endpoints).

Therefore, it would have been obvious to combine Yamazaki with Chakraborty et al.,

Ibison et al. and Chiba et al. to obtain the invention of claim 6.

***

18.   Claims 8, 22, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as applied to

claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in view of

Pasco et al. (US 6,064,778).

19.   Regarding claim 8, and similarly claims 22 and 36, Chakraborty et al. and Ibison

et al. disclose/suggest everything except the following, which Pasco et al. teaches

- fitting the line segments comprises determining skew angles of the rows
  of symbols based on orientations of the line segments
  [Fig. 3b, numerals 56, 62, 66; Col. 8, lines 41-47; Col. 9, lines 38-
  41, 49-50]

Chakraborty et al., Ibison et al. and Pasco et al. are combinable because they are from

the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to modify Chakraborty et al. and Ibison et al. with the teaching of Pasco et al. by

determining skew angles of the rows of symbols based on orientations of the line

segments. The motivation would have been to be able to automatically detect the skew

of a document so that compensation can be made in order to improve compression

efficiency. [Pasco et al.: Col. 1, lines 33-43.]

Therefore, it would have been obvious to combine Pasco et al. with Chakraborty et al.

and Ibison et al. to obtain the invention of claim 8.

***

20.   Claims 9, 23, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as applied to

claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in view of

Snyder et al. (US 6,195,474).

21.   Regarding claim 9, and similarly claims 23 and 37, Chakraborty et al. and Ibison

et al. disclose/suggest everything except the following, which Snyder et al. teaches

- finding the group of the line segments comprises selecting the line
  segments for inclusion in. the group based on numbers of the edge points
  that are located on each of the selected line segments
  [Col. 6, line 67 - Col. 7, line 4. Note that the selection of the
  lines is based on the number of edge pixels]

Chakraborty et al., Ibison et al. and Snyder et al. are combinable because they are from

the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Chakraborty et al. and Ibison et al. with the teaching of Snyder et al. by selecting lines basing on the edge point number criteria. The motivation would have been to be pick the best fitted line (via Hough transform) since the number of included edge points is an obvious indication of line fitting accuracy.

Therefore, it would have been obvious to combine Snyder et al. with Chakraborty et al. and Ibison et al. to obtain the invention of claim 9.

***

22.   Claims 11, 25, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as applied to claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in view of Messelodi et al. ("Automatic Identification and Skew estimation of Text Lines in Real Scene Images," *Pattern Recognition* 32 (1999), pp. 791-810).

23.   Regarding claim 11, and similarly claims 25 and 39, Chakraborty et al. and Ibison et al. disclose/suggest everything except the following, which Messelodi et al. teaches

- identifying the region comprises selecting a plurality of regions
  containing respective groups of the line segments at different skew
  angles
  [Fig. 10; P. 804, left column, 2nd paragraph, lines 7-10]

Chakraborty et al., Ibison et al. and Messelodi et al. are combinable because they are

from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art

to modify Chakraborty et al. and Ibison et al. with the teaching of Messelodi et al. by

selecting regions containing respective groups of the line segments at different skew

angles. The motivation would have been to be able to automatically segment text

blocks that have different orientations (as often occur on book covers) so that they can

be de-skewed to improve the performance of subsequent OCR operations.

Therefore, it would have been obvious to combine Messelodi et al. with Chakraborty et

al. and Ibison et al. to obtain the invention of claim 11.

***

24.   Claims 13-14, 27-28, 41-42 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Chakraborty et al. (US 5,995,695) and Ibison et al. (US 5,506,913) as

applied to claims 1, 2, 7, 10, 12, 15, 16, 21, 24, 26, 29, 30, 35, 38, 40 above, further in

view of Moed et al. (US 5,770,841).

25.   Regarding claim 13, and similarly claims 27 and 41, Chakraborty et al. and Ibison

et al. disclose/suggest everything except the following, which Moed et al. teaches

  •   the object comprises a parcel

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[Fig. 1, numerals 20a, 20b,20c; Col. 5, lines 10-13]
• the one or more rows of the characters comprise address information for
  the parcel
  [Fig. 2, numeral 38-40; Col. 5, lines 38-43]
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Chakraborty et al., Ibison et al. and Moed et al. are combinable because they are from the same field of endeavor of image processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Chakraborty et al. and Ibison et al. with the teaching of Moed et al. by applying their line fitting, grouping, and OCR to address blocks on parcels. The motivation would have been to automate address interpretation in mail processing in order to improve throughput and to reduce labor cost.

Therefore, it would have been obvious to combine Moed et al. with Chakraborty et al. and Ibison et al. to obtain the invention of claim 13.

26.   Regarding claim 14, and similarly claims 28 and 42, Moed et al. further teaches

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• sorting the parcel responsive to the address information
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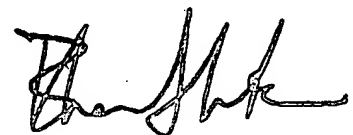[Abstract: lines 14-17]

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung

Patent Examiner

June 3, 2004

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